

**U.S. Environmental Protection Agency
Advisory Council on Clean Air Compliance Analysis (Council)
Special Council Panel for the Review of the Third 812 Analysis
Summary Minutes of Public Teleconference
Date: September 24, 2003**

Committee Members: (See Roster - Attachment A)

Date and Time: 12 pm to 2 pm, September 24, 2003 (See Federal Register Notice - Attachment B.)

Location: By teleconference only

Purpose: The purpose of the call was to provide the Special Council Panel with the opportunity to: discuss two charge questions relating to the Agency's draft analytical plan: Charge Question 32 relating to Data Quality and Intermediate Data Products and Charge Question 33 relating to Results Aggregation and Reporting.

Attendees: Chair: Dr. Trudy Cameron, Dr. David Allen, Ms. Laurie Chestnut, Drs. Larry Goulder, James Hammitt, Dale Hattis, Charles Kolstad, Virginia McConnell, Bart Ostro, Kerry Smith, Tom Wallsten.

From EPA: James DeMocker Eric Ginsburg, John Langstaff, Tom Braverman, Al McGartland, Brian Heninger, Nathalie Simon, Chris Dockins, Richard Garbaccio, Peter Nagelhout, Trish Koman. EPA Contractors: Jim Neumann, Jason Price, IEC.

Other Participants: Ms. Dawn Grodzki, Inside EPA

Meeting Summary:

The followed the issues and timing as presented in the meeting Agenda (see Meeting Agenda - Attachment C). The teleconference lasted until 2:00 pm. There were no written comments submitted to the Committee, and there was no written request to present public comments during the discussion.

Welcome and Introductions - Dr. Trudy Cameron, the Chair, opened the session at 1 p.m. welcoming members of the panel (Roster, Attachment A). Dr. Angela Nugent, Designated Federal Official (DFO) took roll. Dr. Cameron referred the Council Special Panel Members to a compilation of comments that Dr. Nugent had circulated to Panel Members prior to the meeting.

Charge Question 32 relating to Data Quality and Intermediate Data Products

Dr. Bart Ostro, Chair of the Health Effects Subcommittee (HES) commented on the conclusions emerging from the draft HES report on the Agency's plans for health effects analysis. He stated that the HES called for clearer presentation of the base case, especially: the populations affected and actual health effects examined. The HES endorsed the reporting of intermediate products. The HES expressed preference for reporting disaggregations by state on the website in the draft report. Regarding

consistency checks and model predictions, the HES may suggest the Agency compare model predictions for 2000 with results. The HES draft reports calls for a clearer statement of the Quality Assurance protocol. The HES acknowledges that the report needs to deal with 2 different types of readers: users at the policy level who don't want the detail; and analysts who may want to "get into" the model and perhaps use the BENMAP software for their own sensitivity analysis and their own assumptions.

A Council member then endorsed the value of comparing projected ambient concentrations with monitored values even before 2000. The Agency might look at time profiles before 2000 and make comparisons, using the first prospective report or a sample of runs. He also suggested that the Agency use information about levels of economic activity by sector and region, and how they affect emissions in 2001 and 2002, since those are drivers of emission rates to check the results of models. Another Council member suggested consideration of additional factors that drive emissions for the future, such as patterns of economic development and demographics so that readers can understand and discuss the Agency's assumptions regarding these factors.

The Council Special Panel then turned to the question of metadata. Mr. DeMocker clarified that the term referred to "data about data." The Agency plans to make all of the data available that it can provide on request. Dr. Cameron asked about a Council member's concern about the costs involved in providing this access, and the Agency's for addressing stakeholder's concerns and needs related to the data. Mr. DeMocker responded that EPA plans to be "strategic in when to post data." Data would be made available after Agency review and any peer review processes.

Another Council member asked about the purpose of providing data. In his view it was "not good to just dump data." The Agency should have a clearly identified purpose, such as to validate a CGE model or to compare model output with real data. In order to evaluate the Agency's strategy, the Council will need more than the information available in the Analytical Plan. More information is needed about the Agency's purposes in making the data available and the analytical strategies envisioned (e.g., comparing PACE data with certain analytical outputs of the analysis).

Yet another member identified priorities for the intermediate data products to make available. In her view, data about different scenarios, such as those addressing mobile source policy options, were more valuable than other data. She suggested that the Agency identify those scenarios/assumptions before it made final decisions about releasing certain data sets. She also asked if EPA could manage the risks involved with providing data. Another panel members suggested that there were risks involved in not making data available, since it is useful for others to check the data to identify mistakes,

A Council member emphasized the importance of the prospective analysis as a "laboratory for understanding methods." He called for the Agency to articulate a process to evaluate methods and learn. If the Agency chooses not to follow the model of the Stanford Modeling Forum, he suggested that the Agency "target" a few databases with a specific goal in mind (such as "getting a clear idea of ambient air quality," or inviting

researchers to do alternative analyses in a particular area with BENMAP). Then the Agency would sponsor a conference to share that information. Such an approach would have a policy goal, would allow the Agency to invite interested researchers so the Agency could learn from their insights, and would allow a more manageable approach to copying with the data that needs to be posted.

The same Council member also emphasized the importance of identifying intermediate outcomes that offer opportunities for consistency checks, such as tracking health conditions by sector in 2000 or looking at precursors to mortality. Another Council member stated that EPA is moving in the direction of funding research identifying new cases of illness relating to air pollution. A Special Council Panel Member pointed to the difficulty of establishing the causal link between air pollution and morbidity, given that multiple factors cause the types of illness identified with air pollution. The Chair of the HES stated that both EPA and Health Effects Institute were conducting relevant studies. He committed to providing citations for a recent Dublin study that observed morbidity and resulting disease-specific mortality and used a validated time-series data model to analyze deaths resulting from a policy change validated time-series.

The Chair summarized written comments concerning the need to validate models, and pitfalls in how the Agency planned to use consistency checks. One Member discussed the need for the Agency to be clear about the different sources of uncertainty and how they effect projections over time. Another Council member cautioned the panel about the modest possibility of doing consistency checks and learning from them. He reminded the Panel that for the analysis, the Agency is comparing "with and without" scenarios. The PACE data is limited and the projected health effects side are not observable. He acknowledged that it is important to compare counts with what the model shows, however, since the models are already based on the best scientific literature, the value of the consistency check may be limited.

Other Members emphasized the importance of some plausibility checks on both the baseline and regulatory regimes. Since neither is observed, there are lots of opportunities for potential "manipulation in how you calculate what the baseline or change might be." There is a larger burden to provide plausibility checks on both the baseline and the change conditions and a need for Agency to provide a level of detail not included in the analytical plan

Charge Question 33 relating to Results Aggregation and Reporting

Dr. Bart Ostro, Chair of the Health Effects Subcommittee (HES) commented on the conclusions emerging from the draft HES report related to the Agency's plans for aggregation. The HES supported the Agency's plans for sectoral disaggregation of health effects and also suggested that some spatial disaggregation should be explored, as well as pollutant-by-pollutant disaggregation. It was not clear to the HES if and how disaggregated information about uncertainties associated with health effects will be presented. The HES recommended against a single alternative analysis and instead

discussed advising the Agency to adopt a base case with a confidence interval addressing a full range of studies. He supported the Agency conducting sensitivity analyses around major issues and to assign some probability weights to different scenarios. The discussion of uncertainty will be addressed in more detail at the face-to-face meeting and it is likely that the recommendations will depend on how results would be used.

In regard to costs, there was an initial discussion of the Council's 2002 recommendation regarding aggregation. The Chair clarified that the Council had recommended that costs for Title 6 be disaggregated, but that all other costs would be disaggregated by sector, not by title. A Council member then suggested that it may be possible to disaggregate some costs, because some costs, such as those associated with mobile source policies, are borne locally.

The Council then turned to the question of whether the Agency should do an analysis of the aggregate present value of costs and benefits. One Panel Member referred to a call in the NAS study for some estimation of the full time-stream of costs and benefits to "fully inform" the policy choice. Other members spoke of the feasibility of modeling costs for which data were not available. One member commented that analysis of the aggregate present value is consistent with the underlying motivation of the study itself. Neglect of present value denies info that can shed light on "profiles of different investment. Another member emphasized the importance of a dynamic evaluation of benefits of long-term impact and use of costs over longer time, and not a linear interpolation. Another Member pointed Panel member to the Agency's current plan to capture effects attributed to 2010 happening in 2030 and discount them back to 2010 and added into 2010 numbers for health effect benefits. Dr. Bryan Hubbell, from EPA's Office of Air Quality Planning and Standards, stated that EPA's non-road diesel analysis has a method for computing present value and committed to providing that information to the Panel. Mr. Jim DeMocker stated that interpolation is more difficult for costs, but if the Agency can estimate the emissions trend line, it may be able to use that information for estimates of the costs and benefits.

The Council Special Panel then discussed the Agency's plan to use benefit-cost ratios in the Analysis and came to a general agreement that such ratios should not be included. One Member criticized EPA's plan to use such ratios and characterize uncertainties, because available software for analyzing uncertainties assumes independence of variables. In the case of the costs and benefits of the Clean Air Act, there's a great deal of dependence among key variables and so "benefit-cost ratios is convenient but wrong." Another Member added that some distinctions between benefits and costs are arbitrary and misleading in the context of a benefit-cost ratio (e.g., medical treatment of costs not incurred if we don't improve health - does that belong in the numerator or denominator). The Panel agreed that the Agency should not include a benefit-cost ratio in the report, but instead include language and illustrations on how such ratios are incorrect and misleading.

The Council then turned to the question of aggregation of benefits. A Council Special Panel Member called for the Agency to prepare a summary section of the report

with a table, disaggregation of results, and discussion of key assumptions and results of sensitivity analyses. Then the Agency would provide the main text, backed up by appendices with detailed exposition of what was calculated. The Agency should anticipate the multiple audiences interested in the report (decision-makers, policy analysts, technical analysts) and provide outputs appropriate for each. He called for a sensitivity analysis to identify the most significant uncertainties and assumptions. He underscored a written comment received that "it was doubtful that formal probability analysis will ever supplant analysis of key assumptions and sensitivities." EPA will need to identify up front the policy decisions and methodology choices made and provide an orderly exposition of findings that resulted. The Panel agreed that this topic needed to be revisited in light of the fuller discussion of EPA plans to use its uncertainty analysis. These plans will occur at the face-to-face meeting.

Next Steps

The group agreed to include the results of the teleconference discussion in the interim report discussed during the September 23, 2003 teleconference call.

The Panel briefly revisited the issue of discount rates and whether the Section 812 rate should simply be a default rate established by the Agency or OMB for other purposes. One member asked whether there is a rationale for something other than standard practice. Another member endorsed the approach advanced during the September 23d call because it focused on the relationship between the value of streams of benefits and costs and the implicit discount rate used in modeling cost response. He saw this as a central issue, which may involve reevaluation of EPA's standard practices. That issue needs to be dealt with in direct terms.

Summary of Action Items

1. Dr. Bart Ostro will provide citations for a recent Dublin study that observed morbidity and resulting disease-specific mortality and used a validated time-series data model to analyze deaths resulting from a policy change validated time-series.
2. Dr. Bryan Hubbell will provide text for present value calculation in support document for EPA's non-load diesel study.
3. Dr. Cameron will revise the interim report to incorporate the results of the teleconference.
4. The DFO will organize a Council Special Panel teleconference during the week of October 20th to prepare for the November 5-6 meeting and allow opportunity to discuss revisions to the Interim Report.

The Chair concluded the meeting by thanking members for their participation. Mr. DeMocker echoed these thanks and appreciation in advance for Council advice.

At 2:00 p.m., Dr. Cameron adjourned the teleconference.

Respectfully Submitted:

/s/ Angela Nugent

Angela Nugent
Designated Federal Official

Certified as True:

/s/ Trudy Cameron

Trudy Cameron
Chair

NOTE AND DISCLAIMER: The minutes of this public meeting reflect diverse ideas and suggestions offered by the Council members and consultants to the Agency during the course of deliberations within the meeting. Such ideas, suggestions and deliberations do not necessarily reflect definitive consensus advice from the Council. The reader is cautioned to not rely on the minutes to represent final, approved, consensus advice and recommendations offered to the Agency. Such advice and recommendations may be found in the final reports prepared and transmitted to the EPA Administrator following the public meetings.

Attachment A - Roster

U.S. Environmental Protection Agency Science Advisory Board Advisory Council on Clean Air Compliance Analysis Special Council Panel for the Review of the Third 812 Analysis

CHAIR

Dr. Trudy Cameron, Raymond F. Mikesell Professor of Environmental and Resource Economics, Department of Economics, University of Oregon, Eugene, OR
Also Member: Executive Committee

MEMBERS

Dr. David T. Allen, The Henry Beckman Professor in Chemical Engineering, Department of Chemical Engineering, University of Texas , Austin, TX

Ms. Lauraine Chestnut, Manager, Stratus Consulting Inc, Boulder , CO

Dr. Lawrence Goulder, Associate Professor, Department of Economics & Institute for International Studies, Stanford University, Stanford, CA
Also Member: Environmental Economics Advisory Committee

Dr. James Hammitt, Professor of Economics and Decision Sciences, Department of Health Policy and Management, School of Public Health, Harvard University, Boston, MA

Dr. F. Reed Johnson, Principal Economist and RTI Fellow, RTI Health Solutions, Research Triangle Institute, Research Triangle Park, NC

Dr. Charles Kolstad, Professor, Department of Economics, Bren School of Environmental Science and Management, University of California, Santa Barbara, CA

Dr. Lester B. Lave, Professor, Graduate School of Industrial Administration, Carnegie Mellon University, Pittsburgh, PA

Dr. Virginia McConnell, Senior Fellow; Professor of Economics, Resources for the Future, Washington, DC

Dr. Bart Ostro, Chief, Air Pollution Epidemiology Unit, California Office of Environmental Health Hazard Assessment (OEHHA), Oakland, CA

Dr. V. Kerry Smith, University Distinguished Professor, Department of Agricultural and Resource Economics, College of Agriculture and Life Sciences, North Carolina State University, Raleigh, NC

OTHER SAB MEMBERS

Dr. Dale Hattis, Research Professor, Center for Technology, Environment, and Development, Marsh Institute, Clark University, Worcester, MA
Member: Environmental Health Committee

CONSULTANTS

Dr. John Evans, Senior Lecturer on Environmental Science, Harvard University, Portsmouth, NH

Dr. D. Warner North, President, NorthWorks Inc, Belmont, CA

Dr. Thomas S Wallsten, Professor, Department of Psychology , University of Maryland, College Park, MD

SCIENCE ADVISORY BOARD STAFF

Dr. Angela Nugent, Designated Federal Officer, 1200 Pennsylvania Avenue, NW, Washington, DC, Phone: 202-564-4562, Fax: 202-501-0323, (nugent.angela@epa.gov)

Attachment B - Federal Register Notice

Science Advisory Board Staff Office Advisory Council on Clean Air Compliance Analysis; Special Council Panel for the Review of the Third 812 Analysis; Notification of Two Upcoming Public Teleconferences

[Federal Register: September 9, 2003 (Volume 68, Number 174)]

[Notices]

[Page 53164-53165]

ENVIRONMENTAL PROTECTION AGENCY

[FRL-7556-9]

Science Advisory Board Staff Office Advisory Council on Clean Air Compliance Analysis; Special Council Panel for the Review of the Third 812 Analysis; Notification of Two Upcoming Public Teleconferences

AGENCY: Environmental Protection Agency (EPA).

ACTION: Notice.

SUMMARY: The EPA Science Advisory Board Staff Office is announcing two public teleconference meetings of the Advisory Council on Clean Air Compliance Analysis Special Council Panel for the Review of the Third 812 Analysis (Panel).

DATES: September 23, 2003. A public teleconference meeting for the Council Panel will be held from 12 p.m. on September 23, 2003 to 1:30 p.m.

September 24, 2003. A public teleconference meeting for the Council Panel will be held from 12 p.m. on September 23, 2003 to 1:30 p.m.

ADDRESSES: Participation in the teleconference meeting will be by teleconference only.

FOR FURTHER INFORMATION CONTACT: Members of the public who wish to

obtain the call-in number and access code to participate in the teleconference meeting may contact Ms. Sandra Friedman, EPA Science Advisory Board Staff, at telephone/voice mail: (202) 564-2526; or via e-mail at: friedman.sandra@epa.gov, or Ms.

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Delores Darden, EPA Science Advisory Board Staff at telephone/voice

mail: (202) 564-2282; or via e-mail at darden.delores@epa.gov. Any

member of the public wishing further information regarding the Council

Special Panel may contact Dr. Angela Nugent, Designated Federal Officer

(DFO), U.S. EPA Science Advisory Board (1400A), 1200 Pennsylvania Avenue, NW., Washington, DC 20460; by telephone/voice mail at (202) 564-4562; or via e-mail at nugent.angela@epa.gov. General information about the SAB can be found in the SAB Web site at <http://www.epa.gov/sab>.

SUPPLEMENTARY INFORMATION:

Background

Pursuant to the Federal Advisory Committee Act, Public Law 92-463, Notice is given that the Council Special Panel will hold two public teleconference meetings, as described above, to advise the Agency on its plan to develop the third in a series of statutorily mandated comprehensive analyses of the total costs and benefits of programs implemented pursuant to the Clean Air Act.

Background on the Council Special Panel and this advisory project was provided in a Federal Register notice published on February 14, 2003 (68 FR 7531-7534).

The Council Special Panel will be providing advice on the review document, "Benefits and Costs of the Clean Air Act 1990-2020; Revised Analytical Plan for EPA's Second Prospective Analysis" currently found at the following website, maintained by EPA's Office of Air and Radiation at: <http://www.epa.gov/oar/sect812/> under the link "Study Blueprint and Charge Questions Electronic Copy." This link provides electronic access to the Revised Analytical Plan, the "change pages" given to the Council in July 2003, and the detailed review charge questions.

Procedures for Providing Public Comment. It is the policy of the EPA Science Advisory Board (SAB) Staff Office to accept written public comments of any length, and to accommodate oral public comments whenever possible. The EPA SAB Staff Office expects that public statements presented at its meetings will not be repetitive of previously submitted oral or written statements.

Oral Comments: In general, each individual or group requesting an oral presentation at a face-to-face meeting will be limited to a total time of ten minutes (unless otherwise indicated). For conference call meetings, opportunities for oral comment will usually be limited to no more than three minutes per speaker and no more than fifteen minutes total. Interested parties should contact the Designated Federal

Official (DFO) at least one week prior to the meeting in order to be placed on the public speaker list for the meeting. Speakers should bring at least 35 copies of their comments and presentation slides for distribution to the participants and public at the meeting.

Written Comments: Although written comments are accepted until the date of the meeting (unless otherwise stated), written comments should be received in the SAB Staff Office at least one week prior to the meeting date so that the comments may be made available to the committee for their consideration. Comments should be supplied to the DFO at the address/contact information noted above in the following formats: one hard copy with original signature, and one electronic copy via e-mail (acceptable file format: Adobe Acrobat, WordPerfect, Word, or Rich Text files (in IBM-PC/Windows 95/98 format). Those providing written comments and who attend the meeting are also asked to bring 35 copies of their comments for public distribution.

Meeting Accommodations: Individuals requiring special accommodation to access these meetings, should contact Dr. Nugent at least five business days prior to the meeting so that appropriate arrangements can be made.

Dated: September 5, 2003.

A. Robert Flaak,
Acting Deputy Director for Management, EPA Science Advisory Board Staff
Office.

Attachment C - Agenda

**U.S. EPA Science Advisory Board (SAB)
Advisory Council on Clean Air Compliance Analysis
Special Council Panel for the Review of the Third 812 Analysis
Advisory Teleconference
September 24, 2003. 12:00-2:00 Eastern time**

Purpose: to discuss two charge questions relating to the Agency's draft analytical plan: Charge Question 32 relating to Data Quality and Intermediate Data Products and Charge Question 33 relating to Results Aggregation and Reporting

Draft Agenda

12:00-12:05	Opening of Meeting and Roll Call	Dr. Angela Nugent, Designated Federal Officer, SAB Staff Office
12:05-12:10	Welcome, Agenda Review	Dr. Trudy Cameron, Chair
12:10-12:20	Public Comment	To be determined.
12:20-12:50	Charge Question 32 relating to Data Quality and Intermediate Data Products	Council Members
	- Report from HES on this issue as it relates to Health Effects	Dr. Bart Ostro, Chair, HES
	- Costs	Lead Discussant, Dr. Charles Kolstad,; Associate Discussant, Dr. Virginia McConnell
	- Benefits	Lead Discussant, Dr. Reed Johnson
12:50-1:30	Charge Question 33 relating to Results Aggregation and Reporting	
	- Report from HES on this issue as it relates to Health Effects	Dr. Bart Ostro, Chair, HES
	- Costs	Lead Discussant, Dr. Virginia McConnell; Associate Discussant, Dr. Charles Kolstad
	- Benefits	Lead Discussant, Dr. Warner North; Associate Discussant, Dr. Reed Johnson

1:30-1:50	Discussion of Substantive Issues Related to the Council Special Panel Draft Report	All Panel Members
1:50-2:00	Summary of Action Items	Dr. Trudy Cameron
2:00	Adjournment of Meeting	

Attachment D

Comments received on Charge Questions 32 and 33

Q32. Plans for Evaluating Data

Reed John Comments

Comments on Chapter 10 – Data Quality and Intermediate Data Products

Chapter 10 of the draft Analytical Plan summarizes EPA's intentions regarding intermediate data products and consistency checks. EPA plans to provide a variety of intermediate analytical results and databases to the public via the EPA website or other unspecified means. The stated rationale is to enable outside researchers to use and quality-check the data used in the analysis.

Providing the enormous amount of information listed in this chapter, developing adequate documentation, and supporting access and use by outsiders is a potentially costly and time-consuming undertaking. In many cases, the relevant databases are available to the public elsewhere. Where the intermediate products involve modeling outputs such as CGE results rather than raw data, it is unclear how researchers can quality-check these results without access to extensive model documentation and the models themselves. In particular, as EPA notes elsewhere, aggregate valuation summaries require careful discussion of assumptions and caveats to avoid misinterpretation. These explanations presumably will not be available in full until the report is issued. Finally, there is always the risk that intermediate results will take on a life of their own. Stakeholders may overreact to preliminary estimates, diverting additional staff resources to manage subsequent public-relations problems.

EPA's interest in involving outside researchers in the analysis is admirable, however. Perhaps a more productive and economical approach would be to use the project's web site to pose specific problems and proposed solutions. Where appropriate, data and preliminary analysis related to a particular problem could be provided to encourage involvement and suggestions from outside experts. This process could be integrated into the basic problem-solving documentation that EPA will have to undertake as a matter of course.

Chapter 10 also outlines EPA's plans for internal consistency checks. This summary appears to treat consistency checking as something that happens after models have been constructed and populated with the necessary parameters. In fact, calibration is a necessary and integral feature of model development. Given the numerous assumptions and simplifications required to build models, it is always necessary to check model performance against known, observed values, and make necessary adjustments to improve accuracy.

Comparing one model's predictions with another model's predictions, rather than with observational data, is more problematic. Different models use different inputs and employ different analytical structures. Thus it often is unclear whether prediction

differences are a result of differences in the input data or differences in the models themselves. (EPA refers to differences in scenarios and differences in modeling approach.) Sometimes it is possible to use one model's data with another model's structure and vice versa to isolate the cause of the discrepancy.

Inevitably, researchers will have to cope with the question of how to resolve inconsistencies. It often is unclear how big the inconsistencies have to be to raise concerns, given inherent modeling uncertainties and measurement error in the data. The public problem-solving procedure suggested above might be useful in developing a professional consensus about how to resolve or explain such discrepancies.

EPA mentions several specific consistency checks. In particular, they plan to compare BenMAP model predictions to actual incidence data. The model predicts changes based on regulatory changes relative to the baseline scenario. EPA notes the inconsistency of trying to compare marginal changes with absolute levels for 2000, but suggests no strategy for checking BenMAP predictions against observational data. Ideally, one would look for a natural experiment where exposures changed, then replicate the experiment with the model to check predicted marginal changes against observed marginal changes.

EPA's statement about economic valuation consistency checks is similarly ambiguous. They suggest comparing unit WTP estimates with COI values. Again, these generally are not congruent measures. Depending on how WTP is obtained, it may only measure pain and suffering, or it may include some components of lost productivity and cost of treatment. Estimated COI values often include only a relatively easily observed subset of the components of the social cost of illness. Moreover, COI estimates often rely on average wage and treatment costs rather than marginal values. Thus the problem of comparing marginal changes with observed averages may crop up in this context, as well.

V. Kerry Smith

I feel there are significant limitations in the plans for data review.

- (1) There does not appear to be a plan to reference the economic projections underlying the emission estimates to actual levels of economic activity in sectoral, regional, or aggregate terms.
- (2) I believe it would be desirable to provide some mechanism for request for the data developed in the detailed runs of air diffusion models for selected areas, such as the South Coast Air Basin in California. This would allow researchers, with models that have the spatial resolution to accommodate these data, the opportunity to use them.
- (3) The benefit analysis information is described in Chapter 10, page 2. Results are described as being produced at the state level and by pollutant-endpoint combination. "Some" uncertainties will be the focus of meta-data.

I need a clearer understanding of meta-data to react to this suggestion. In addition,

these results should be matched to other economic data at the same spatial resolution to offer opportunities for cross checks – Census economic information on household income, health statistics on related (actual) health conditions that might be associated with morbidity or mortality rates.

(4) Detailed input information and assumptions to CGE analysis are essential to evaluating the outputs.

(5) Consistency Checks – evaluations should not be limited to the first and second prospective reports. Add to proposed consistency.

- comparisons to levels of economic activity by sector and region in actual years covered and with independent national projects (e.g. using area Federal Reserve Banks or other federal sources for economic forecasts).
- include more explicit consideration of time profiles prior to 2000 (of actual ambient readings) in comparison to levels and profiles projected for future policy effects.
- more attention to cases of health conditions that might precede the mortality outcomes. What do the available results suggest for new serious lung and heart conditions?
- comparison of estimates to household income and to WTP estimates from current hedonic or random utility models for specific areas has historical precedence, which is not incorporated in as a gauge of plausibility even though results can overlap.

V. McConnell

Intermediate Data Products

The scenarios to be examined are still being determined by the EPA. The Council has suggested some changes to the scenarios suggested in Chapter 2 of the Draft Analytical Plan (see Council comments in the Interim draft report), and other scenarios are still under review. One important scenario or set of scenarios are those that look at additional controls beyond current Clean Air Act provisions. EPA is still in the process of defining those, but assumptions about how controls will be tightened and the data and methods used will be important to provide on an interim basis. These scenarios are particularly important because they will suggest directions for future regulations.

Consistency Checks

A full understanding of the sources of differences in the costs and benefits results by title, provision, and source between the first and second prospective studies is critical for interpreting the results of the second prospective. The EPA appears to be considering a number of possible ways to make those comparisons. Comparison of outcomes at the most disaggregated levels is important (at what level of detail would the comparison of results be provided in the Appendix? An Appendix is suggested on P. 10-4).

Because this prospective study will be undertaking more disaggregated analyses, with results by source category and even provision in some cases, there may be possibilities to compare the results, particularly for the 2000 time frame, to other studies that have been done. Are the results consistent with those from other studies? There could be some attempt to suggest what might give rise to the differences.

C.D. Kolstad (18 Sept 2003)

This charge question concerns Chapter 10 and questions whether the methods proposed for data validation are adequate. This response concerns that portion of the question related to costs.

The goal of this chapter is to address the issue of validation, ostensibly of data, but also of analytic methods used. This latter point is not explicit in the chapter but implicit, through validation of output from supporting models.

The EPA appears to be relying on two methods for validating data in the cost area: (1) publishing detailed model outputs to expose the data to scrutiny by third parties; and (2) comparing certain “produced data” (eg, model output) with counterpart real data. These are both good ideas and clearly strengthen the analysis.

Another approach, recommended by the Council in 2001 was to examine several models that purport to address the same issue, similar to the way the Stanford Energy Modeling Forum compares different models. That approach is rejected in the Analytical Plan because it is assumed to involve comparing old versions of the same model with more modern versions. That is clearly inappropriate and we concur with the conclusion that comparing old and new would be difficult. However, there are often several choices of modern up-to-date models that examine the same question. For instance, there are several competing CGE models that can be used to calculate costs of regulatory interventions. The authors of the Analytical Plan have not offered a reason for not pursuing this type of comparison.

Generally speaking, the validation approaches adopted in the Analytical Plan are appropriate, valuable and make a positive contribution to the analysis. A relevant question to ask is whether this is enough. In our view this is the correct approach to validation but more can be done in each categories referenced above.

With respect to the first of the two validation approaches (i.e., publishing detailed model outputs), third parties will be interested in more than model output. The issue is generating confidence in the validating of the computations. For instance, to ascertain that a CGE models is producing reliable results, validation involves examining far more than output – one needs to “look under the hood.” Simply put, third parties will be

interested in data inputs as well as intermediate calculations. For instance, abatement cost curves may be important inputs into a cost model and their nature will be of significant relevance to validating models. It is suggested that key intermediate data within a model be made publicly available in addition to the data articulated in Figure 10-1.

With respect to the second of the two validation approaches, comparing produced data with counterpart real data is a great idea, limited only by the availability of appropriate real data. In the case of direct costs and CGE results, it is suggested that the comparison be made with PACE data. Although this is a lofty goal, it is unclear how this will be done. And the devil is in the details. How will data on expenditures for pollution control be used to compare to abatement costs relative to a counterfactual, let alone total economic costs? This is a worthwhile undertaking and we would encourage that the methods be fleshed out further.

Q33. Plans for Results Aggregation

Reed Johnson Comments

Comments on Chapter 11 – Results Aggregation and Reporting

Chapter 11 of the draft Analytical Plan outlines how EPA intends to report results. The plan proposes some changes relative to procedures used in the first prospective study. For example, EPA acknowledges previous SAB comments about reporting benefit-cost ratios. They plan to report B/C ratios in this study, but de-emphasize them relative to net-benefit estimates. The role of “appropriate explanation” is important to help readers avoid well-known problems with using B/C ratios for decision making. EPA wisely does not intend to provide annual interpolations of net-benefit estimates between target years because of the difficulty of quantifying uncertainties related to interpolation. However, EPA indicates they may produce annual estimates for future years because future annual estimates at a temporal resolution finer than a decade “can be more reliably estimated.” Although such estimates would not involve interpolation, it is not clear that the errors inherent in predicting outcomes farther in the future are necessarily smaller than the errors of interpolating between more accurate measures. EPA notes some potential problems with sectoral and spatial disaggregation because of nonlinearities, jointness, and incidence dispersion through markets. These problems can result in subadditivity or superadditivity when aggregating up from component estimates or down from total estimates. The example of the geographic dispersion of cost incidence from power plant emission-control investments in Indiana may also apply to benefits in a general-equilibrium analysis. Improved health that improves worker productivity may benefit a firm’s shareholders and customers in distant locations. EPA’s example of how to allocate visibility benefits between the national park where the physical improvement occurs and the home location of visitors suggests that geographical disaggregation involves arbitrary judgments that may be difficult to defend.

Because sectoral and geographic incidence is of interest to policy makers, it will be necessary to add evaluation of alternative disaggregation schemes to the already long list of sensitivity and uncertainty analyses this study will require.

EPA's primary, central estimates are based on a set of assumptions the study staff finds most plausible or defensible. In the past providing alternative estimates based on alternative assumptions or methods has been their primary method of uncertainty analysis. EPA anticipates eventually using a more sophisticated, formal probability analysis to characterize uncertainty, but will continue to include alternative estimates in the meantime. It is doubtful that formal probability analysis ever will supplant exploration of alternative assumptions and methods. For example, I know of no way to characterize the relative uncertainty of QALY-based measures versus cost per life saved measures of cost effectiveness. These two approaches embody different social judgments about what the maximand should be in the objective function for public health and safety policies and different professional judgments about the reliability and validity of different methods, not uncertainty, per se. EPA should replace simple sensitivity analysis around uncertain estimates with improved probabilistic analysis, but continue to provide alternative estimates for assumptions and methods that require methodological and value judgments.

V. Kerry Smith Comments

- (1) I do not favor any use of benefit-cost ratios. This concept does not have a consistent economic interpretation. Consequently, these ratios do not offer new information. Given greater attention to uncertainty, use of ratios would require consideration of how the variance in the ratio of random variables was derived. There are approaches (e.g. see Leo Goodman) but this seems to add needless complexity.
- (2) I agree with the deletion of present value of net benefits given practices used to estimate time profiles of costs and benefits.
- (3) Sectoral decomposition of benefits and costs must be compared and reconciled with sectoral analysis from CGE model. Explanation for discrepancies between sectoral and aggregation analyses are not clear. I do not understand the "non-linearities" referred to as the source.
- (4) Spatial disaggregation of benefits should include access to spatially delineated projections for ambient concentrations of pollution. This could offer opportunity for comparison to a few hedonic, property, and wage studies.
- (5) Uncertainty analysis should consider variations in key elements of scenarios as well as Monte Carlo simulation for variation in parameter estimates.

V. McConnell

September 2003

This chapter deals with the aggregating, reporting and comparing the cost and benefit results.

Proposed Approach for Second Prospective.

Primary Central Results.

In this second prospective, the cumulative or present value of costs, benefits, and net benefits will not be presented. The reason given is that the time path of both costs and benefits are not linear. An example provided is that there may be high up front costs, with benefits in later years. However, this issue has been implicitly dealt with in the annual estimates. For example, the annual costs in each reported year (2000, 2010, 2020) are average annual costs. If there are up-front capital costs, these are annualized to get the annual estimates for the target years. I think it is fine not report the cumulative estimates, but perhaps the nature of the annual estimates should be made more clear and they should be called “average annual costs and benefits.”

Spatial Disaggregation

Although there are many regulations for which it will not make sense to spatially disaggregate costs, there may be some exceptions. It seems important to consider the examining costs and benefits by geographical area for some provisions of the Act, for some sources. For example, additional local controls to meet NAAQS may have costs and benefits that are borne primarily within the region. Certain future policies may make sense in some regions, and not in others. Reporting state by state costs and benefits is probably does not capture the right geographic area, but it seems important to consider regional disaggregation for some cases.

Pollutant-endpoint Disaggregation

On a related issue to the one addressed in the text. Chapter 11 does not describe any reporting of cost-effectiveness measures in the second prospective. The first prospective study did provide some cost- per-life-saved measures. Given that the results are estimated and reported on a more disaggregated basis, there may be some cases where these cost-effectiveness estimates can be provided.

Results of Uncertainty Analysis.

The Council has not yet discussed in the detail the uncertainty analyses described in Chapter 9. We may wish to revisit the reporting of results on these issues after that discussion.

The last paragraph states that changing the discount rate will have little effect on the results, because there are no net present value estimates calculated. However, changing the discount rate does affect the annual results in various ways, including the cost estimates if capital costs have been annualized to get an estimate of average annual costs.

C.D. Kolstad (18 Sept 2003)

This chapter concerns results aggregation and reporting, though perhaps could more meaningfully be termed results disaggregation. This issue is the extent to which costs should be reported, disaggregated spatially (e.g., by state), by CAAA Title, or by sector.

The Council advised in 2001 against spatial disaggregation of costs, due to issues of incidence, and the Analytical Plan adopts that suggestion with a nicely phrased argument and explanation. The Council also had urged disaggregating costs by Title. Although this is not explicitly treated in the text of the Chapter, Table 11-2 suggests that costs will be aggregated over Titles I through IV. The Council would prefer more of a disaggregation by Title and suggests that the Plan present reasons why this is not possible or desirable. To a certain extent, presenting costs by major sector, as planned, will involve generating the kind of data needed to do title-by-title disaggregation. In sectoral reporting, it is not clear what sectoral breakdown will be used.